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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/669,436

09/25/2003

Benjamin F. Dorfman

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06/15/2005

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EXAMINER

ELLINGTON, ALANDRA

ART UNIT

PAPER NUMBER

2855

DATE MAILED: 06/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

5

Office Action Summary	Application No.	Applicant(s)	
	10/669,436	DORFMAN, BENJAMIN F.	
	Examiner	Art Unit	
	Alandra Ellington	2855	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 5-29 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1, 5, 8-10, 12-17, 19, 20, 22 and 23 is/are rejected.
- 7) ☒ Claim(s) 7, 11, 18, 21 and 24-29 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/25/03</u> . | 6) <input type="checkbox"/> Other: ____. |

Non-Final Rejection

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 6. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 5, 8-10, 16, 17, 19, 20, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Yang et al (6,071,597) (hereinafter Yang).

- a. With respect to Claim 5, Yang discloses a stress sensor comprising a first electrode 3,11; at least one other electrode 3,11; and a dielectric layer 2 disposed in relation to the first and the at least one other electrode 3,11, for the electrodes 3,11 to supply an electric field to the dielectric layer 2, wherein the dielectric layer 2 comprises a diamond-like carbon film 4 that exhibits a change in conductivity when exposed to an electric field at a level above a critical electric field and wherein the critical electric field of the diamond-like film 4 shifts under an applied stress (col. 7 lines 45-51, col. 13 lines 48-55, col. 14 lines 7-53).
- b. With respect to Claim 8, Yang discloses the stress sensor of claim 5, wherein the diamond-like carbon film is a stabilized diamond-like carbon film (col. 2 lines 4-10, col. 5 lines 43-45, col. 6 lines 47-67).
- c. With respect to Claim 9, Yang discloses the stress sensor of claim 8, wherein the diamond-like carbon film is stabilized with silica (col. 2 lines 4-10, col. 5 lines 43-45, col. 6 lines 47-67).
- d. With respect to Claim 10, Yang discloses the stress sensor of claim 5, wherein the resistivity of the diamond-like carbon film changes from a first value of about 10^{11} to 10^{13} ohm.cm to a second value of about 10^8 to 10^9 ohm.cm (col. 2 lines 15-25).
- e. With respect to Claim 16, Yang discloses the stress sensor of claim 5, comprising a plurality of other electrodes 3 disposed onto the dielectric layer 2 to form an array of sensors ({Figs. 4,8,9}).

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- f. With respect to Claim 17, Yang discloses the stress sensor of claim 5, wherein the first electrode 3 and the at least one other electrode 3 are disposed laterally with respect to each other (col. 7 lines 45-51 {Fig. 4}).
- g. With respect to Claim 19, Yang discloses the stress sensor of claim 5, wherein at least one of the first electrode 3,11 and the at least one other electrode 3,11 comprises a conductive diamond-like carbon film 4 (col. 7 lines 45-54).
- h. With respect to Claim 20, Yang discloses the stress sensor of claim 20, wherein the conductive diamond-like carbon film 4 comprises at least one metal introduced into a matrix of a diamond-like carbon film 4 (col. 8 lines 10-14,58-62).
- i. With respect to Claim 22, Yang discloses a stress sensor comprising a first electrode 3,11; at least one other electrode 3,11; and a sensing layer 2 disposed in relation to the first and the at least one other electrode 3,11, for the electrodes 3,11 to supply an electric field to the sensing layer 2, wherein the sensing layer 2 comprises a material 4 that exhibits a change in conductivity when exposed to an electric field at a level above a critical electric field and wherein the critical electric field of the material 4 shifts under an applied stress (col. 7 lines 45-51, col. 13 lines 48-55, col. 14 lines 7-53).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al (US 2003/0129497) (hereinafter Yamamoto) in view of Chang et al (6,469,390) (hereinafter Chang).

a. With respect to Claim 1, Yamamoto discloses a process for measuring stress on a surface having an insulating coating comprising measuring resistivity of the coating, and determining therefrom the stress on the surface, wherein the coating comprises a dielectric film (pg. 7 [0116], pg. 9 [0142]). However, Yamamoto does not specifically teach a silica-stabilized dielectric film. Chang teaches a silica-stabilized dielectric film (col. 2 lines 1-11, 45-67, col. 3 lines 1-30). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Yamamoto with the teachings of Chang to include a silica-stabilized dielectric film for the purpose of reducing capacitive coupling in the device (see Chang, col. 2 lines 1-11, 45-67, col. 3 lines 1-30).

6. Claims 6, 12-15, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang (6,071,597) in view of Hubbard (5,797,623).

a. With respect to Claim 6, Yang discloses the claimed invention except for specifically teaching the sensor operating in real-time. Hubbard teaches a sensor 10 operating in real-time (col. 2 lines 33-35, col. 7 lines 35-61). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Yang with the teachings of Hubbard to include a sensor

operating at real-time for the purpose of sensing the impact location and impact energy in real-time (see Hubbard, col. 2 lines 33-35, col. 7 lines 35-61).

b. With respect to Claim 12, Yang discloses the claimed invention except for the conductivity of the film reversibly changing when exposed to the electric field. Hubbard teaches the conductivity of a film reversibly changing when exposed to an electric field (col. 3 lines 30-58). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Yang with the teachings of Hubbard to include the conductivity of a film reversibly changing when exposed to an electric field for the purpose of performing accurate measurements during operation (see Hubbard, col. 3 lines 30-58).

c. With respect to Claim 13, Yang discloses the claimed invention except for specifically teaching the diamond-like carbon layer disposed between the first electrode and at least one other electrode. Hubbard teaches a dielectric film disposed between two electrodes (col. 2 line 67, col. 3 lines 1-2 {Figs. 1,2}). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Yang with the teachings of Hubbard to include a diamond-like carbon layer disposed between the first electrode and at least one other electrode for the purpose of generating an electrical output in order to accurately measure an impact force, strain energy, and velocity (col. 2 line 67, col. 3 lines 1-2).

- c. With respect to Claim 14, Hubbard teaches a dielectric layer deposited onto a surface of a conductive structure being measured for stress and wherein an electrode comprises the conductive structure (col. 3 lines 1-42 {Figs. 1,2}).
- d. With respect to Claim 15, Hubbard teaches a conductive film deposited onto a surface of a non-conductive structure being measured for stress and wherein the film is deposited onto the conductive film and a first electrode comprises the conductive film deposited on the structure (col. 3 lines 1-42 {Figs. 1,2}).
- e. With respect to Claim 23, Yang discloses a stress sensor comprising a first electrode 3,11; at least one other electrode 3,11; and a dielectric layer 2 disposed in relation to the first and the at least one other electrode 3,11, for the electrodes 3,11 to supply an electric field to the dielectric layer 2, wherein the dielectric layer 2 comprises a diamond-like carbon film 4 that exhibits a change in conductivity when exposed to an electric field at a level above a critical electric field and wherein the critical electric field of the diamond-like film 4 shifts under an applied stress (col. 7 lines 45-51, col. 13 lines 48-55, col. 14 lines 7-53). However, Yang does not specifically teach a real-time reversible change in conductivity when exposed to an electric field. Hubbard teaches a real-time reversible change in conductivity when exposed to an electric field (col. 2 lines 33-35, col. 3 lines 30-58, col. 7 lines 35-61). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Yang with the teachings of Hubbard to include a real-time reversible change in

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conductivity when exposed to an electric field for the purpose of performing accurate measurements in real-time during operation (see Hubbard, col. 2 lines 33-35, col. 3 lines 30-58, col. 7 lines 35-61).

Allowable Subject Matter

7. Claims 7, 11, 18, 21, and 24-29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: The reasons for the indication of allowable subject matter are based on the inclusion of:

- a. In Claim 7, the critical electric field comprises about 2×10^5 V/cm.
- b. In Claim 11, the compressive forces on the diamond-like carbon film lowers the value of the critical electric field and wherein tensile forces on the diamond-like carbon film increases the value of the critical electric field.
- c. In Claim 18, the electrodes are disposed laterally with respect to each other a distance no greater than the thickness of the diamond-like carbon film.
- d. In Claim 21, a plurality of electrodes, wherein the diamond-like carbon film is deposited onto a surface of a structure being measured for stress as a continuous layer to serve as a sensing layer for the plurality of the electrodes.
- e. In Claim 24, the method step of determining whether the particular level of stress has been applied to the structure based on a change in the conductivity of the dielectric layer.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

(6,268,161) (5,726,524) (6,835,523)

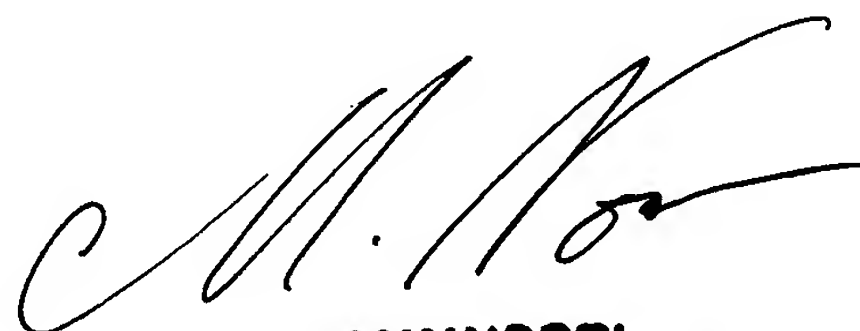
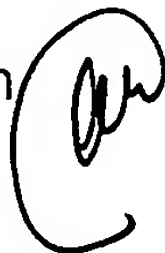
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alandra Ellington whose telephone number is (571) 272-2178. The examiner can normally be reached on Monday - Friday, 8:30am - 5:00pm.

11. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

12. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Art Unit 2855

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PRIMARY EXAMINER